38

Integrating with 3D Applications

Real 3D programs have several advantages over After Effects: For example, their objects have real depth, and the texturing and lighting options are far more advanced. However, this power often comes with a significant speed penalty, which can be a problem when accommodating client changes. After Effects is also the better tool in which to refine the final look of your 3D worlds. Offloading portions of the work from your 3D program to After Effects will save time while giving you more power and flexibility – but it requires some effort to set up.

Techniques to get more information from your 3D program into After Effects.

Tight integration makes it easier to add video and other layers to 3D environments in After Effects. Video courtesy Creative License; textures courtesy Artbeats.

In this chapter, we will give advice on how to successfully integrate your 3D program with After Effects. We will then work through a pair of case studies: Adding 2D video to the face of a 3D object, and integrating lights and shadows between After Effects and your 3D render. The DVD also contains a bonus chapter which covers the 3D Effects that can access additional information saved with some 3D renders such as the Z buffer (how far objects are away from the camera).

Unfortunately, there is no one universal file format to bring information from a 3D application into After Effects. In our case studies, we are going to focus on using Maxon Cinema 4D as it currently has the tightest integration with After Effects, plus is the 3D program we personally use. However, many of the concepts we'll be covering are universal and can be applied to other programs as well. We will also include some specific advice for programs such as Autodesk Maya and 3ds Max.

FACTOID

3D Channel Effects
Bonus Chapter 38B on this book's DVD covers the special 3D Channel effects such as Depth of Field and Fog 3D, as well as how to replicate their results with 3D programs not directly supported by these plug-ins.

Example Project
Explore the 38-Example Project.aep file as you read this chapter; references to [Ex.##] refer to specific compositions within the project file.
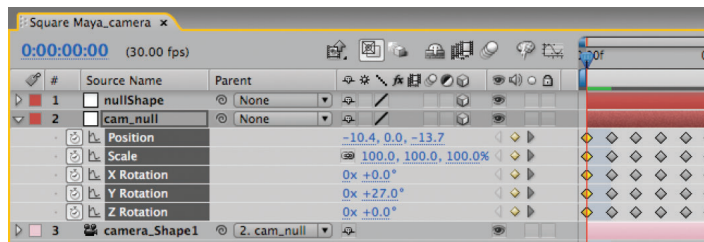
Motion Blur

If you rendered your 3D scene with motion blur enabled, you should also enable motion blur for the 3D layers you add in After Effects. Don't forget to match the blur's shutter angle you used in your 3D program.
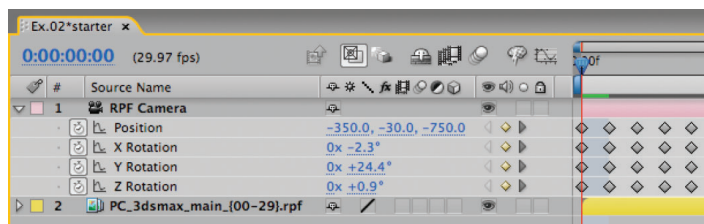
GOTCHA

Maya Camera Import Bug

There is a known bug in the initial release of After Effects CS3 where some Maya .ma projects may import at the wrong size. For example, **Maya_camera.ma** included on this book's disc imports as 540x486 pixels, when it should be 320x240.

3D Advice

The next few sections include topics to keep in mind as you work on a project that will flow from a 3D program to After Effects. This includes getting the camera move across, lining up world coordinates between the two programs, and creating mattes so that select objects in the 3D world will appear to pass in front of layers added in After Effects.

The Camera Move

A typical workflow will include finalizing your camera move in the 3D program, rendering the 3D scene, then bringing the camera move and render into After Effects. Your render will be a 2D layer in After Effects, as it already has the camera move calculated into it; you can optionally enhance the render using After Effects' tools. You can then add new 3D layers on top of this render in After Effects, using the camera data you moved across. For example, you can add text, video, and other objects to your scene in After Effects without having to go back into your 3D program for another potentially lengthy re-render.

It is a really, really good idea to finalize the camera move before bringing it into After Effects. Changing the camera move means having to re-render the 3D scene as well as replace the camera move in After Effects. Do a few rough renders and get the client to sign off on the general idea and movement before putting in too much work.

The way you move camera data from a 3D application into After Effects varies from program to program. Here are some of the more common options:

• Export your project to the .ma – Maya ASCII – format. After Effects can then import this project through its normal File > Import menu command; it will extract the camera movement from this file along with the movement of any null objects that explicitly have the word "NULL" or "null" in their name. You can practice this with the file **38_Chapter Sources > Maya > Maya_camera.ma**. The result – with new video composited into the scene – is demonstrated in this chapter's example project in the comp [**Ex.01-Maya Import**].

• Embed the camera move in a .rla or .rpf frame sequence when you render. Bring this sequence into an After Effects comp, select it, and use Animation > Keyframe Assistant > RPF Camera Import.

Maya ASCII (.ma) project files may be imported directly into After Effects. The result is a comp with the Maya camera, any null object with "null" in its name, parenting chains including cameras and nulls, and their animation.

Programs such as 3ds Max can embed their camera move in an RPF file sequence during their render. After Effects can extract this data to create a matching camera of its own.

After Effects will then create its own camera with the same movement. You can practice this with the comp [**Ex.02*starter**]; the result – along with some additional compositing tricks using 3D Effects – is demonstrated in [**Ex.02_final**].

• Cinema 4D has the ability to save an .aec project file which contains the camera move and much, much more (which we will discuss in detail in the upcoming case studies). After Effects can then import the .aec file with a Maxon-supplied plug-in.

• If the functionality you need isn't built into your 3d program of choice, you may be able to write a spreadsheet or script that converts keyframe data from your 3D program into After Effects keyframe data, and paste that into a new camera created in After Effects; see the *Camera Data Translation* sidebar for leads on others who have already.

• Worst case, create an object in your 3D world in the same location as layers you would like to add in After Effects, with obvious markers in its corners. Make a separate render pass of this object, and use Motion Tracking in After Effects to corner pin your new layer into the position and perspective you had in mind. This was demonstrated in Chapter 29's [**Ex.05**]; another example is included in this chapter's [**Ex.03**].

Sometimes, your imported camera move will not appear to match the motion in your 3D render. The most common problem is that the Angle of View for the After Effects camera is wrong. Verify the value for this parameter (also known as Field of View) in your 3D program, and enter this value manually in the Camera Settings dialog in After Effects.

Camera Data Translation

Several third parties have developed ways to get camera data from 3D programs into After Effects:

• Helge Mathee (*www.mindthink.de*) has created a Softimage|XSI script that can save camera and light data as an .aec file, which can then be imported using Maxon's Cinema 4D import plug-in.

• The TransMotion Utilities Pack (*www.ats-3d.com*) gives users of older versions of LightWave several options beyond .rpf files to get camera and other data from LightWave to After Effects.

Less common is being able to transfer AE's camera data back to a 3D program. Exceptions include:

• Paul Tuersley of AE Enhancers (*www.aenhancers.com*) has written a script to get an After Effects camera move back into Cinema 4D.

• MAX2AE from Boomer Labs (*www.boomerlabs.com*) allows you to import a scene from After Effects into 3ds Max 6 or later. It also provides a nice alternative to importing Max scenes into After Effects, including support for lights and "helper planes."

• Likewise, 3DMation's MoCon (*www.3dmation.com*) is an inexpensive collection of scripts to transfer 3D motion to and from After Effects, Maya, Nuke, SynthEyes and Electric Image, including going from After Effects into Maya.

If there is no way to import the camera data from your 3D program into After Effects, you can create a 3D model with dots to track in After Effects (A), and corner pin a new layer in After Effects to their location (B). 3D renders courtesy Reject Barn.

Some 3D programs also do not take into account any curves you may have applied to the camera's path or speed. Therefore, you will often need to "bake" the camera move in the 3D program to create a keyframe for every frame of your timeline before exporting its move. For example, in Maya use Edit > Keys > Bake Simulation in Maya.
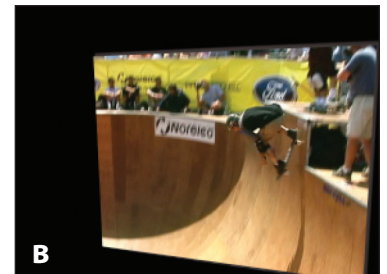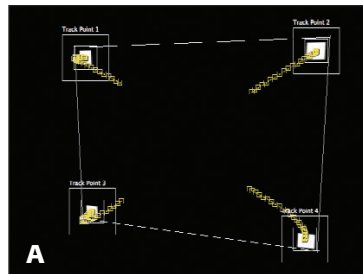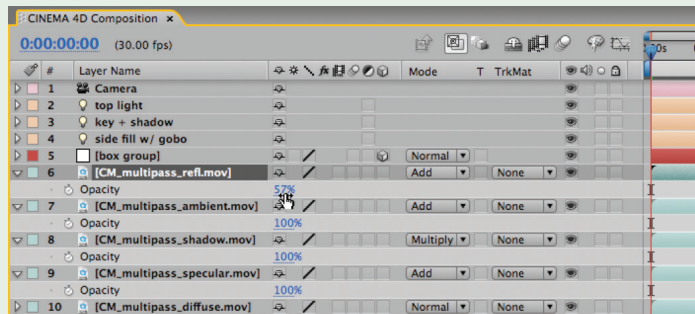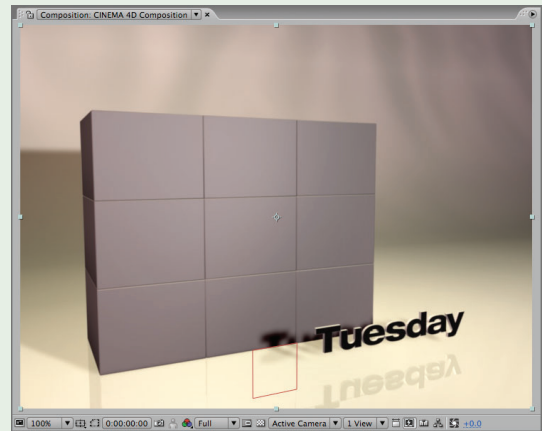
Multipass Rendering

There are other ways to combine 3D programs and After Effects into an overall workflow. For example, as an alternative to creating object buffers, some like to render 3D objects (such as logos) as individual elements with alpha channels, then composite them in After Effects.

Another related trick is called *Channel Lighting*, in which you render two passes from your 3D program: one with the normal materials applied to your objects and 100% ambient light, and a second with a plain white material applied and each light given a color of red, green, or blue. The contributions of these colored lights can then be isolated, recolored, and blended inside After Effects without having to return to your 3D program. The Walker Effects plug-ins make this easy, including documentation on how to pull it off (visit them at *www.walkereffects.com* and look under Tour > Channel Lighting).

Many 3D artists like to render individual aspects of their scene – for instance, diffuse color, specular highlights, shadows, reflections – as independent "passes" to be re-blended in After Effects using a combination of alpha channel and blending modes (Multiply for shadows, Add or Screen for reflections and other color passes). This results in a high degree of control, such as being able to change the strength of a reflection map or darkness of a shadow without having to go back into the original 3D project.

Most 3D programs require you to set up and render each of these passes individually. If you are trying to isolate specific properties perhaps on just a few objects in your scene, you can tweak your project file as needed between renders. If you know you will be tweaking a multipass render later in After Effects, it is a good idea to "overdo" properties such as shadow darkness, specular highlights, and reflections so that you have some latitude to increase

Multipass rendering gives you the power to adjust the strength of shadows, highlights, and reflections after the fact. Experiment for yourself with **[Ex.05]**; the original Cinema project is **C4D videowall_multipass.c4d**.

or decrease the opacity of these layers (and therefore, their contribution to the final composite) without having to render the scene over from scratch.

In the **[Ex.05]** folder, we have included a render from Cinema 4D that demonstrates some of this power. Cinema is the current king of integration with After Effects: It has a dedicated Multi-Pass render section where you can set which properties will be rendered to their own files simultaneously with the main render, and it will create an After Effects project with all of these properties already arranged in a composition using the correct modes. Have fun playing with the opacities of the various layers. We've increased the shadow darkness and amount of reflection in the original Cinema project to give you a wider value range to play with.
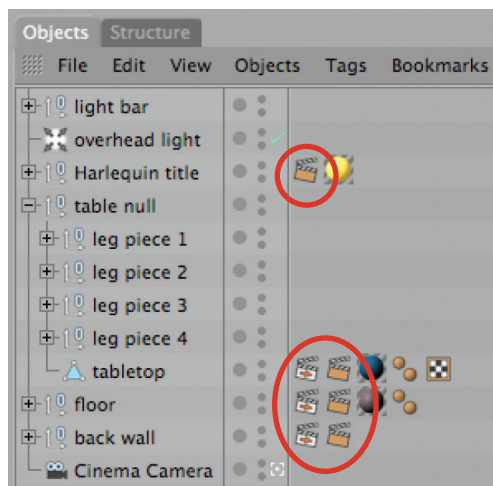
Steps 1–2: We added Compositing and External Compositing tags to the **tabletop**, **floor**, and **back wall** models to generate null objects and mattes for them in After Effects. We also added a Compositing tag to generate a matte for the **Harlequin title** model.

Study #2: Shadow Trickery

One of the more challenging areas of integrating a 3D render with After Effects objects is handling the shadows. You'd like for any new objects you add in After Effects to cast 3D shadows onto objects in the original 3D render. However, the 3D render must be imported as a 2D layer, and 3D layers cannot cast 3D shadows onto 2D layers. Your choices? Do without, fake it with an ordinary 2D Drop Shadow effect, or do a little extra work: Add 3D layers in After Effects to mimic objects in the original 3D scene which can then catch the 3D shadows. Let's try this last approach.

Open **Ex.06 > Cinema 4D Composition**; it contains a scene that will look familiar to those who made it to the end of our introductory book, *After Effects Apprentice*. Here are the steps needed to make it shadow-friendly in After Effects:

Step 1: The wall, floor, and table are candidates to catch shadows, so we need to know where to place their stand-ins in After Effects. We made a note of their sizes and where their faces were located in 3D space. In Cinema, we set their anchors to the center of their faces, then applied External Compositing tags (discussed in the previous section) to these models. This resulted in null objects being created for them in the corresponding .aec file.

Step 2: To crop our stand-in layers, we needed to render mattes that corresponded to just the visible portions of the faces of these models. In Cinema, we applied Compositing tags to these objects and assigned them to individual Object Buffers. We did the same for the Harlequin title so we could place layers in After Effects "between" the title and the wall.

Step 3: Once these 3D passes were rendered, we imported them along with the camera and light data into After Effects. We've already done this for you; if you have the Cinema import plug-in installed, you can do this yourself: Import **38_Chapter Sources > shadow study > AEA Room.aec**.

Open the comp **Ex.06 > CINEMA 4D Composition** and note the three null objects **back wall**, **floor**, and **tabletop**. You need to replace these with solids. Here are the steps for one; the others are done the same way:

Step 4: The face of the **back wall** model piece is roughly 3110 wide × 1050 high in "world units" in Cinema, so create a Layer > New > Solid of this size, using square pixels and colored white. Name it "**wall shadow**" and click OK.

Step 5: Next, you need to move this shadow catcher into the same position as the wall. To do this, enable the 3D Layer switch for **wall shadow**. Select **back wall** (the null object created by Cinema) and type P followed by Shift+R to reveal its Position and Rotation parameters. Copy these, and paste them to **wall shadow**.
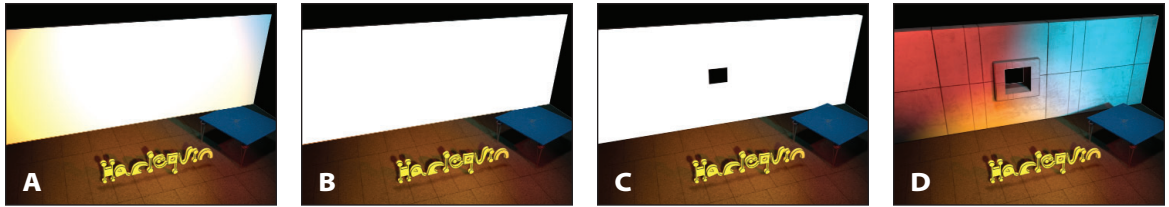
Steps 4–8: Create a white solid the size of the back wall, put it in the same position (A), set its Material Options > Accepts Lights to Off (B), crop it by its corresponding matte (C), and set its Mode to Multiply (D) so it blends into the original 3D render.

Step 6: We want this layer to receive our new shadows, but not otherwise be affected by lights in this scene. With **wall shadow** still selected, type AA to reveal its Material Options in the Timeline. Leave Casts Shadows = Off and Accepts Shadows = On (their defaults), but set Accepts Lights to Off.

Step 7: The shadow catcher needs to be matted to match the visible portions of the 3D wall. In the **Special Passes** folder, locate **AEA Room_object _2.mov** and drag it into your comp just above wall shadow. Reveal the Modes column (F4) and set the TrkMat popup for **wall shadow** to Luma Matte.

Step 8: To composite just the dark shadows – not the wall's white color – onto the back wall, set the Mode popup for **wall shadow** to Multiply.

After you're done, new 3D layers added in After Effects can cast shadows on the wall, floor, and table. If you have Cinema and are up for a challenge, use our projects to also create a shadow catcher for the Harlequin title…

Step 9: Add a layer to the scene in After Effects, enable its 3D switch, and enable Cast Shadows. Its shadow will appear on the back wall of the original 3D render. Feel free to tweak the color, intensity, and shadow darkness of the lights originally created in Cinema to work best for your new layers in After Effects, but keep their positions if you want the new shadows to match the original render.

If you want to cast shadows on the floor or table, repeat steps 4–9 above and use these parameters:

• The floor is about 3100×2050 pixels in size and uses Object Buffer 3. You will need to set its X Orientation to 270° to flip it down horizontally.

• The tabletop is approximately 512×512 pixels and uses Object Buffer 4. Due to differences in how the object was created in Cinema, disable keyframing for the three Rotation values, zero out Y Rotation and instead set Z Rotation to –17°, and set X Orientation to 270° to flip it down.

The comp [**Ex.06-Shadow Trickery_final**] has these three shadow catcher layers set up, with some new objects casting shadows. Adding 3D elements from After Effects into a fully rendered 3D world creates an interesting hybrid look in its own right, you can also gain substantial flexibility from distributing your workflow between the programs.

CONNECT

Blending modes: Chapter 9.

Track mattes: Chapter 11.

3D space, cameras, and lighting: Chapters 13–15.

Null objects and parenting: Chapter 16.

Time stretching: Chapter 27.

Corner pin motion tracking: Chapter 29.

Expressions: Chapter 35.

Importing files and the Interpret Footage dialog: Chapter 36.

Pixel aspect ratios and frame rates: Chapter 39.